

## **CLAIMS**

What is claimed is:

1. A method, comprising:
  - placing a plurality of fibers into a mold, the fibers oriented approximately in the x and y directions;
  - adding a second plurality of fibers;
  - disposing a heat conductive material around the fibers; and
  - curing the heat conductive material.
2. The method of claim 1, wherein the fibers are woven.
3. The method of claim 1, wherein the fibers are comprised of carbon.
4. The method of claim 1, wherein the second plurality of fibers are oriented in approximately a vertical direction.
5. The method of claim 1, wherein the second plurality of fibers is chopped.
6. A heat spreader, comprising:
  - a plurality of fibers oriented approximately along a horizontal axis;

- a second plurality of fibers oriented approximately along the second horizontal axis, approximately perpendicular to the first set of fibers;
- a third plurality of fibers, some or all oriented approximately in the vertical direction, approximately perpendicular to the first and second sets of fibers; and
- a conductive material disposed about the fibers.
7. The heat spreader of claim 6, wherein the fibers are comprised of carbon.
8. The heat spreader of claim 6, wherein the fibers are woven.
9. The heat spreader of 6, wherein the third plurality of fibers are chopped.
10. A heat spreader, comprising:
- a first layer of fibers, oriented approximately along a horizontal axis;
- a second layer of fibers, oriented approximately along the same horizontal axis, the second layer having a different fiber density than the first layer;
- a second plurality of fibers in the second layer, oriented approximately along a second horizontal axis, approximately perpendicular to the first set of fibers in the second layer;
- a third plurality of fibers in the second layer, oriented approximately in the vertical direction, approximately perpendicular to the first and second sets of fibers in the second layer;

a third layer of fibers, having a fiber density different than the fiber density of the second layer; and

a conductive material disposed about the fibers.

11. The heat spreader of claim 10, wherein the first and third layers have a higher fiber density than the second layer.
12. The heat spreader of claim 10, wherein the first and third layers have similar fiber densities.
13. The heat spreader of claim 10, wherein the fibers are comprised of carbon.
14. The heat spreader of claim 10, wherein the fibers are woven.
15. The heat spreader of claim 11, wherein the fibers in the first and third layers are chopped.
16. A semiconductor package, comprising:
  - a substrate having a top surface;
  - at least one semiconductor device attached to said top surface of said substrate;

a cover secured to said substrate creating a space therebetween, said semiconductor device residing within said space, said cover having a flat top surface and an external bottom surface;

    a first plurality of fibers disposed throughout said cover,  
said first plurality of fibrous structures disposed in mostly horizontal directions in  
said cover; and

    a second plurality of fibrous structures disposed throughout said cover,  
said second plurality of fibers disposed in a mostly vertical direction in said cover.

17. The semiconductor package of claim 16, wherein the cover is further comprised of a composite material.
18. The semiconductor package of claim 16, wherein the fibers are further comprised of carbon.
19. The semiconductor package of claim 16, further comprising a heat sink that is attached to the flat top surface of the cover.
20. The semiconductor package of claim 16, wherein the cover is secured to the substrate using a sealant.

21. The semiconductor package of claim 16, further comprising a plurality of posts disposed between the substrate and the bottom plate to provide support to the cover.
22. The semiconductor package of claim 21, wherein the posts are comprised of polymeric materials.
23. A semiconductor package, comprising:
- a substrate having a top surface;
  - at least one semiconductor device attached to said top surface of said substrate;
  - a cover secured to the substrate creating a space therebetween, the semiconductor device residing within the space, the cover having a flat top surface and an external bottom surface, the top surface and the external bottom surface being constructed of a thermal interface material;
  - a first plurality of fibers disposed throughout the cover, the first plurality of fibers disposed in an approximately horizontal directions in the cover; and
  - a second plurality of fibers disposed throughout the cover, the second plurality of fibers disposed in an approximately vertical direction in the cover.

24. The semiconductor package of claim 23, wherein said cover is further comprised of a composite material.
25. The semiconductor package of claim 23, wherein the fibers are further comprised of carbon.
26. The semiconductor package of claim 23, where the thermal interface material is comprised of the same material as the composite.
27. The semiconductor package of claim 26, further comprising a heat sink that is attached to the flat top surface of the cover.
28. The semiconductor package of claim 23, where the interface material is comprised of the composite material wherein the fiber density is greater than that of the cover fiber density.
29. The semiconductor package of claim 24, further comprising a plurality of posts disposed between said substrate and said bottom plate to provide support to said cover.
30. The semiconductor package of claim 29, where said posts are comprised of polymeric material.